



# Digitalizing electricity systems



ENERGY



18<sup>th</sup> Session of the Group of Experts on Cleaner  
Electricity System

**UNECE**

Date 2022 | 09 | 20

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## Session's Goals

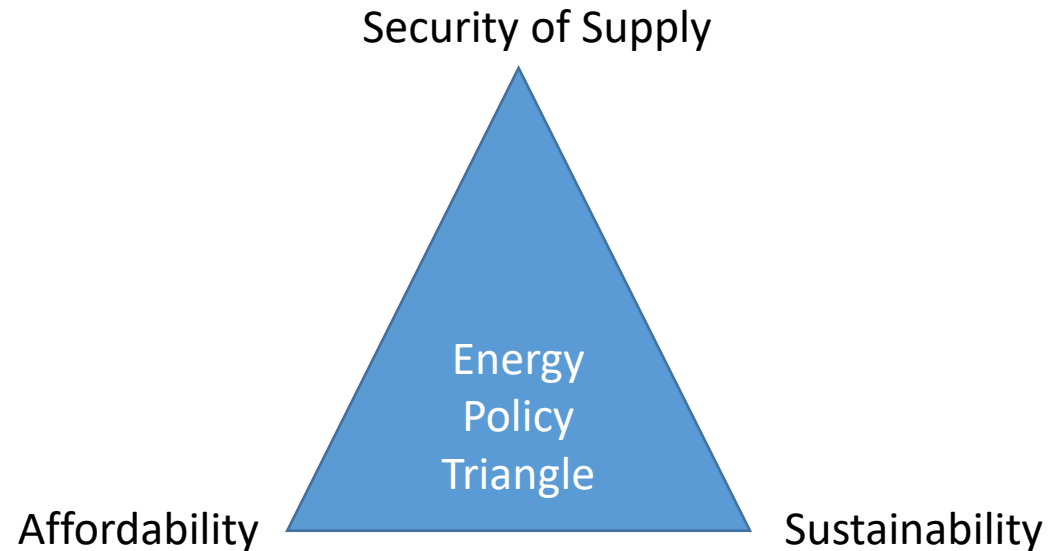
- Explain what is digitalization and the changing electricity landscape
- Present opportunities and challenges of digitalizing electricity systems
- Discuss the contribution of digitalization to a cleaner more resilient electricity system



# Introduction

# The Electricity Landscape is Changing

- Extreme weather events
- Adaptation to climate changes
- Energy crisis
- Grid resiliency
- Decarbonation
- Energy transition
- Electrification
- Integration of renewables and distributed energy resources (DER)
- Changing role of consumers
- Etc.



**Electricity is vital for society**



# What is Electric Grid Digitalization?

# Simplified Overview of an Electric Grid

## Generation

## Transmission

## Distribution and distributed energy resources (DER)



- Generating units
- Step-up Substation
- Protection, automation and control (PAC) system
- Instrumentation (sensors, etc.)

- High voltage grid
- Substations: transmission and step down
- Energy Storage
- Protection, automation and control (PAC) system

- Distribution lines
- Advance metering infrastructure (smart meters)
- Distributed Energy Resources (DER):
  - Solar panels
  - Batteries (storage)
  - EV
  - Smart buildings
  - Microgrid
  - Etc.

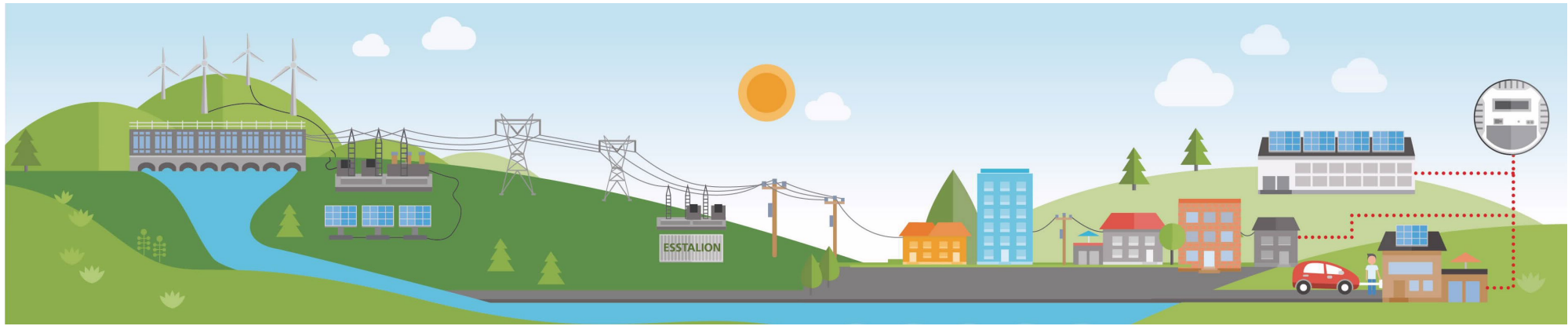
# What is Digitalization?

## Definition:

Leveraging the process of converting physical or analog information into a systematic digital format to transform business model, decision for advancing overall productivity, cost, safety and sustainability



# Digitalization of the Electric Grid



## Generation

- Modernize systems (protection, automation and control) with a next-generation technology digital platform

## Transmission

- Modernize systems (protection, automation and control) with a next-generation technology digital platform
- Digitalize yard
- Implement remote monitoring with existing technology

## Distribution

- More automation (reclosers, intelligent grid, etc.)
- More data collection and usage
- Workforce and assets management

## Data collection, analytics

- Enhance assets management
- Optimize operations
- Facilitate identification of lower-carbon goals and solutions